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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,339	02/21/2001	Sadaji Tsuge	P107336-00018	1063

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EXAMINER	
MUTSCHLER, BRIAN L	
ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/788,339	TSUGE, SADAJI	
	Examiner	Art Unit	
	Brian L. Mutschler	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,5 and 7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5 and 7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-307791, herein referred to as JP '791, in view of Yamagishi et al. (U.S. Pat. No. 6,300,556) and in view of Green et al. (U.S. Pat. No. 5,942,050).

Regarding claim 1, JP '791 disclose a solar cell module comprising a solar cell **1** encapsulated within a sealing resin **2**, and having a glass front surface side light transmitting member **3** and a resin film rear surface member **4** (fig. 1). Both the front surface side light transmitting member **3** and the rear surface member **4** transmit incident light (fig. 1). The sealing resin **2** is interposed between the front surface light transmitting member **3** and the solar cells **1** and is also interposed between the rear surface member **4** and the solar cells **1** (fig. 1). The solar cell **1** comprises a n-type crystalline silicon substrate **11** and has amorphous silicon semiconductor layers **12**, **13**, **16** and **17** formed thereon, including p-type amorphous layer **14**, which forms a pin junction with the substrate **11** (fig. 2). The solar cell **1** also has two transparent electrodes **14** and **18** at the top and bottom surfaces (fig. 2). These electrodes allow light to enter from both the front and rear surfaces of the solar cell module (fig. 1).

Regarding claim 2, light is incident from both sides of the solar cell (fig. 1).

Regarding claims 4 and 5, the rear surface member is formed of a transparent resin film (PET) (see figure 1 and paragraph [0025]).

Regarding claim 7, the solar cell element **1** comprises four amorphous semiconductor layers **12**, **13**, **16** and **17** (fig. 2).

The solar cell module of JP '791 differs from the instant invention because JP '791 does not disclose that the front surface side light transmitting member contains sodium and that a p-n junction is formed between the crystalline substrate and the thin film amorphous semiconductor layer such that the crystalline substrate is formed between the thin film amorphous semiconductor layer and the light incidence side light transmitting member, as recited in claim 1.

Regarding claim 1, Yamagishi et al. disclose the use of soda lime glass, which contains sodium, as a surface member (col. 7, line 29). Soda lime glass is a conventional glass used in solar cell modules because it is inexpensive.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell module of JP '791 to use soda lime glass as the front surface member, as taught by Yamagishi et al., because soda lime glass is very inexpensive and provides excellent weather resistance. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP § 2144.07.

JP '791 discloses an intrinsic layer **12** between the n-type crystalline substrate **11** and the p-type amorphous layer **13**. Intrinsic layers help reduce recombination at the junction, but do not alter the operation of the junction between the p-type and n-type semiconductor layers. (On page 5 of Applicant's response received February 27, 2004, Applicant acknowledges the junction of JP '791 as a p-n junction.) Green et al. teaches that intrinsic layers are optional (col. 4, lines 61-63). The omission of an element and its function is obvious if the function of the element is not desired. *Ex parte Wu*, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989). See MPEP § 2144.04. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell element of JP '791 by deleting the intrinsic layer because the omission of an element and its function is obvious if the function is not desired and Green et al. teach that intrinsic layers are optional.

Regarding the position of the crystalline substrate with respect to the thin film amorphous layer and the light incidence side light transmitting member, the solar cell module of JP '791 allows light to enter from both sides. Therefore, light coming in from either direction contributes to the generation of electricity. Because both sides of the solar cell are light transmitting and the incidence depends on the installation of the solar cell with respect to the light source, the position of the crystalline substrate with respect to the "light incidence side member" is irrelevant. Therefore, the claimed placement is an obvious rearrangement of parts.

3. Claims 1, 2, 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanoka et al. (U.S. Pat. No. 6,353,042) in view of Yamagishi et al. (U.S. Pat. No. 6,300,556), JP 11-307791, and Green et al. (U.S. Pat. No. 5,942,050).

Regarding claim 1, Hanoka et al. disclose a solar cell module having a plurality of solar cells **22** encapsulated within a sealing material **10** (fig. 2). A front surface light transmitting member **26** is made of glass, and a rear surface member **28** is made of glass or a resin, such as Tedlar™, a transparent film (col. 5, line 65 to col. 6, line 9). A transparent film would allow light to enter from both sides of the solar cell. The solar cells **22** may comprise crystalline or amorphous material and may be made of silicon or one of several other semiconductor materials (col. 1, lines 31-35; col. 6, lines 19-59). Hanoka et al. specifically disclose a module as shown in figure 2, "a solar cell module **20** in which the encapsulant material **10** encapsulates interconnected crystalline silicon solar cells **22**" (col. 5, lines 55-57). Hanoka et al. is silent on the details of the junction within the crystalline silicon solar cells **22**.

Regarding claims 2, 4, and 5, Hanoka et al. disclose a front surface light transmitting member **26** is made of glass, and a rear surface member **28** is made of glass or a resin, such as Tedlar™, a transparent film (col. 5, line 65 to col. 6, line 9). This structure permits light to enter from either side of the solar cell.

The solar cell module disclosed by Hanoka et al. differs from the instant invention because Hanoka et al. do not disclose the following:

a. The front surface member containing sodium, as recited in claim 1.

b. The solar cell having a p- or n-type crystalline silicon substrate and an n- or p-type semiconductor layer formed on the substrate to form a p-n junction, as recited in claim 1.

c. The p-n junction is formed between the crystalline substrate and the thin film amorphous semiconductor layer such that the crystalline substrate is formed between the thin film amorphous semiconductor layer and the light incidence side light transmitting member, as recited in claim 1.

Regarding claim 1, Yamagishi et al. disclose the use of soda lime glass, which contains sodium, as a surface member (col. 7, line 29). Soda lime glass is a conventional glass used in solar cell modules because it is inexpensive.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell module of Hanoka et al. to use soda lime glass as the front surface member, as taught by Yamagishi et al., because soda lime glass is very inexpensive and provides excellent weather resistance.

Regarding claim 1, JP '791 disclose a solar cell module comprising a solar cell **1** encapsulated within a sealing resin **2**, and having a glass front surface side light transmitting member **3** and a resin film rear surface member **4** (fig. 1). The solar cell **1** comprises a n-type crystalline silicon substrate **11** and has amorphous silicon semiconductor layers **12**, **13**, **16** and **17** formed thereon, including p-type layer **13** (fig. 2). The solar cell **1** also has two transparent electrodes **14** and **18** on the top and

bottom surfaces (fig. 2). These electrodes allow light to enter from both the front and rear surfaces of the solar cell module (fig. 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell module of Hanoka et al. to use a crystalline silicon substrate and an amorphous layer forming a heterojunction, as taught by JP '791, because the solar cell of JP '791 efficiently utilizes all of the light incident on both sides of the solar cell.

JP '791 discloses an intrinsic layer **12** between the n-type crystalline substrate **11** and the p-type amorphous layer **13**. Intrinsic layers help reduce recombination at the junction, but do not alter the operation of the junction between the p-type and n-type semiconductor layers. (On page 5 of Applicant's response received February 27, 2004, Applicant acknowledges the junction of JP '791 as a p-n junction.) Green et al. teaches that intrinsic layers are optional (col. 4, lines 61-63). The omission of an element and its function is obvious if the function of the element is not desired. *Ex parte Wu*, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989). See MPEP § 2144.04. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell element of JP '791 by deleting the intrinsic layer because the omission of an element and its function is obvious if the function is not desired and Green et al. teach that intrinsic layers are optional.

Response to Arguments

4. Applicant's arguments filed September 24, 2004, have been fully considered but they are not persuasive.

5. Regarding the rejection of the claims over JP '791, Yamagishi, and Green et al., Applicant argues that the combination would not have a crystalline substrate positioned between the amorphous layer and the light incidence side light transmitting member (see page 6 of Applicant's response). This argument is not persuasive because both sides of the solar cell module in JP '791 are light incident sides. Therefore, either orientation of the crystalline substrate with respect to the light transmitting member and amorphous layer is equally efficient.

6. Regarding the rejection of the claims over Hanoka, Yamagishi, JP '791, and Green et al., Applicant relies on the same argument. However, Hanoka et al. teach that both the front surface light transmitting member and the rear surface member can be made of glass. Since both sides are light transmitting and made of glass, both possible orientations are satisfied.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (571) 272-1341. The examiner can normally be reached on Monday-Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BLM
October 29, 2004

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SUPERVISORY PATENT EXAMINER
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